INTRODUCTION

As in any organization, planning takes place at multiple levels, and requires both awareness of and consistency with the goals and perspectives specific to the different levels. Within NOAA, there is a strong central plan (NOAA Strategic Plan) setting forth the missions, goals, and expectations of the total organization overall. Each NOAA line office (e.g., NMFS) then has its own subordinate plan to outline the mission it serves and link with appropriate parts of the NOAA Strategic Plan. Within the NOAA line offices, additional plans are prepared to implement programs specified at higher levels. The NMFS Strategic Plan for Fisheries Research (NSPFR) is such a document. This plan must address the intent of Congress as expressed in legislation while maintaining consistency with the research and management framework established within NOAA. As such, this document incorporates research planning elements across four NOAA levels: from the overarching NOAA Strategic Plan, to the NOAA Fisheries Strategic Plan (NFSP), to this NSPFR, and lastly, to the six Fisheries Science Center research plans.

The scope of the NSPFR is specific to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) with respect to fisheries, habitat, and protected resources research. It does not include the regulatory and enforcement components of the NMFS mission. This Plan updates the 1998 (original) and 2001 editions of the NSPFR. It covers current research activities as well as strategies for improving data collection, analysis, and dissemination.

This Plan represents an integration of multiple perspectives on the fisheries research needs of American society drawn from numerous sources. The NMFS research planning process itself includes extensive communication with our partners (e.g., fisheries management councils, the states, and other governmental organizations) and our constituents. NMFS research programs are periodically reviewed by informal and formal program reviews, with both internal and external participation. NMFS scientists serve on Fishery Management Council scientific committees, plan development teams, and boards where research inadequacies are identified firsthand. Regulatory and judicial proceedings also identify information needs that are then incorporated in the research programs. Finally, NMFS scientists work together with international counterparts to identify and fill information gaps that otherwise constrain management of marine resources both domestically and on the high-seas.

Relationship Between the NOAA Strategic Plan and NMFS Programs

THE NOAA STRATEGIC PLAN: NEW PRIORITIES FOR THE 21ST CENTURY

NOAA has recently updated the structure and content of its strategic plan to better address NOAA mandates. NOAA's focus through 2008 will be on four Mission Goals:

1. Protect, restore, and manage the use of coastal and ocean resources through ecosystem-based management.
2. Understand climate variability and change to enhance society's ability to plan and respond.
3. Serve society's needs for weather and water information.
4. Support the Nation's commerce with information for safe, efficient, and environmentally sound transportation (NOAA, 2003).

In an effort to build specific core strengths, NOAA has selected six core capabilities called "Cross-Cutting Priorities For The 21st Century" that it recognizes as closely allied and essential to support its four mission goals

- Integrated Global Environmental Observation and Data Management System;
- Environmental Literacy, Outreach, and Education;
- Sound, Reliable, State-of-the-Art Research;
- International Cooperation and Collaboration;
- Homeland Security; and
- Organizational Excellence.

Virtually all of the NMFS programs, including the research programs, are encompassed entirely within NOAA's Mission Goal 1, focused on coastal and ocean resources. However, many NMFS programs have outputs that also serve the Cross-Cutting Priorities. By being attuned to broader needs, program managers can ensure additional benefits are obtained. Nevertheless, the primary purpose of nearly all NMFS programs is to accomplish a specific requirement within Goal 1, usually as mandated by legislation. The two exceptions are the seafood inspection activities that are now identified as specifically supporting the Homeland Security Cross-Cutting Priority and climate-related research on ecosystem productivity that resides in Goal 2.

NOAA has identified three strategic objectives under Goal 1:

- Protect, restore, and manage the use of our ocean, coastal, and Great Lakes resources.
- Protect, restore, and manage species and their habitats listed under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA).

A beluga whale fitted with a tracking device. Photo: AFSC.

- Manage and rebuild fisheries to population levels that will support economically viable and sustainable harvests.

Indicators of progress (outcome measures) are:

- Increased number of coastal and marine ecosystems maintained at a healthy, sustainable level.
- Increased social and economic value of the marine environment and resources (e.g., seafood, recreation, and tourism).
- Increased number of acres and stream-miles restored for coastal and ocean species.
- Increased number of protected species in a stable condition or an upward trend.
- Increased number of managed species that are at optimum levels.
- Improved ecological conditions in coastal and ocean protected areas.

The summary and full versions of the Plan are available at http://www.osp.noaa.gov/.

Relation of the NOAA Fisheries Strategic Plan and This NMFS Strategic Plan for Fisheries Research

The NFSP (Priorities for the 21st Century: NOAA Fisheries' Strategic Plan for FY 2003–FY 2008) guides NMFS activities in support of NOAA's mission and its underpinning goals and objectives. It interweaves with the NOAA Strategic Plan by establishing indicators of progress, and their associated performance measures and metrics in the context of NOAA's Strategic Goal 1. Details regarding the NFSP are available at http://www.nmfs.noaa.gov/mb/.

The NFSP requires the support of research to meet most of its objectives. As an Agency-wide strategic plan, it must address all relevant legislative mandates, and closely correspond to the NOAA Strategic Plan. However, the NSPFR has a somewhat different structure that is specific to the content mandated by the MSFCMA.

This NSPFR guides the suite of programs that address the research objectives of NMFS necessary to implement the MSFCMA as amended by the Sustainable Fisheries Act (SFA). This encompasses much of NMFS research activities regarding fisheries and habitat issues and includes specific Fisheries Science Center plans as well. Research on marine mammals, turtles, and protected species of fish, such as the endangered white abalone and shortnose sturgeon, is included but only when it is directed at MSFCMA requirements.

The following table (Table 1) presents the outline of this MSFCMA-required research strategic plan in the left column and shows how the corresponding strategies and their elements of the NFSP relate to it on the right. A similar table included as Appendix A presents the outline of the NFSP strategies and elements and shows how the corresponding elements of the MSFCMA-required research plan relate to the broader Agency plan.

Overview of Planning Documents

Over the last several years there have been numerous outside reviews of NMFS research programs and plans have been developed to implement the recommendations of these reviews. These program-specific reviews and plans have greatly influenced this present Plan. Overviews of the more important reviews and plans are presented below.

Internal Planning Documents:

- *Requirements for Improved and Integrated Conservation of Fisheries, Protected Resources and Habitat* (January, 2003).

Many internal and external reports have evaluated the science and management of

NMFS Strategic Plan for Fisheries Research	NOAA Fisheries Strategic Plan
I. Research to support fishery conservation and management	
I.A. Biological research concerning stock abundance	Monitor and Observe: - Observers - Observing Platforms/Advanced Technology - Industry Partnerships Assess and Predict: SAIP Implementation
I.B. Social and economic factors affecting abundance levels	Monitor and Observe: Social Science
I.C. Interdependence of fisheries or stocks of fish	Assess and Predict - Ecosystem Modeling
I.D. Identifying, restoring, and mapping of essential fish habitat	Monitor and Observe: Habitat Assessments/ Restoration Monitoring
I.E. Impact of anthropogenic factors and environmental changes on fish populations	Understand and Describe: - Habitat - Marine Noise
II. Conservation engineering research	Manage: Bycatch Reduction
III. Research on the fisheries	
III.A. Social and economic research	Monitor and Observe: Social Science Understand and Describe: Economics and Social Sciences
III.B. Seafood safety research	Cross-Cut Priorities: Homeland Security
III.C. Marine aquaculture	Manage: Aquaculture
IV. Information management research	Monitor and Observe: Fisheries Information System

Table1. Comparing the NSPFR and the NFSP

NMFS and made recommendations for improvements. In light of these different reports and recommendations, NMFS has produced a single requirements document that outlines specific changes in programs, processes, and strategies over the next 5 years that should be made in an integrated manner. Both the funding and expected outcomes above and beyond current efforts are described. The report focuses on the science and management changes needed to achieve the stewardship goals of rebuilding and sustaining marine and anadromous fisheries, and satisfying our protected species and habitat conservation mandates. An Executive Summary is being finalized and will soon be available at http://www.nmfs.noaa.gov/mb/ (NMFS, 2003d).

Sorting a survey catch from Seguam Pass in the Aleutian Islands. Photo: Jay Orr, AFSC.

- *NMFS Marine Fisheries Stock Assessment Improvement Plan* (SAIP) (October 2001)
  The Marine Fisheries SAIP is the report of the NMFS National Task Force for Improving Fish Stock Assessments. This report is the latest of a series of plans for enhancing and modernizing NMFS programs for data collection, information technology, data management, stock assessments, scientific research, and fisheries management. The report includes specific recommendations for improving the quality of NMFS' stock assessment programs and emphasizes the need for the agency to foster partnerships and cooperative research programs with other federal agencies, state agencies, private foundations, universities, commercial and recreational fishing organizations and individuals, environmental groups, and others with a vested interest in collecting similar types of data. Recommendations from the SAIP have formed the basis for successful budget initiatives to augment funding for improving stock assessments. The SAIP is available at: http://www.st.nmfs.gov/st2/saip.html (NMFS, 2001).

- NM*FS Strategic Plan for Fisheries Research* (1998 and 2001)
  Originally released in 1998 as a requirement of the Sustainable Fisheries Act of 1996, these first two Plans were purposely framed to be consistent with previous planning initiatives, yet with a more detailed focus on NMFS research activities. In particular, the Plans functioned as a subset of the NFSP. The objectives found under the "Major Fishery Research Goals and Objectives" section of the Plans can be matched with strategies in the previous NFSP (1997). The 1998 NSPFR is available at www.nmfs.noaa.gov/sfa/stratpln.pdf. The 2001 Plan is available at http://www.st.nmfs.gov/st2/strategic_plan.html.

- *NOAA Fisheries Data Acquisition Plan* (1998)
  Released in September of 1998, this document represents a 5-year strategy for meeting NMFS' rapidly growing at-sea data requirements. The Plan provides an overview of the existing data acquisition program, describes anticipated growth and changes to data requirements in the future, details options available, and presents a suite of recommendations for meeting these challenges, including the construction of a fleet of modern Fisheries Research Vessels. Recommendations from the Plan have formed the basis for budget decisions relative to the acquisition of at-sea data. This Plan is available from the NMFS Web site at http://www.st.nmfs.gov/st2/omb_link.html.

External Reviews by the National Research Council (NRC)

- *Improving Fish Stock Assessments* (1998)
  Published in 1998, this report commissioned by NMFS reviews the agency's current stock assessment methods and models and makes recommendations for alternative approaches. The objective of the review was to produce an authoritative report that documented the strengths and limitations of stock assessment methods relative to the diversity of available data and types of fisheries management systems. The report can be read on-line or purchased at the National Academy Press Web site at www.nap.edu / (NRC, 1998).

- *Sustaining Marine Fisheries* (1999)
  Published in 1999, this NRC commissioned report explores the nature of marine ecosystems and the complex interacting factors that shape their productivity. The book documents the condition of marine fisheries in 1999, highlighting species and geographic areas that were under particular stress. Challenges to achieving sustainability are discussed, and shortcomings of existing fisheries management and regulation are examined. The report calls for fisheries management to adopt a broader ecosystem perspective that encompasses all relevant environmental and human influences, but also emphasizes that the first step towards ecosystem-based management is to reduce fishing mortality on individual stocks to optimal levels. It can be read on-line or purchased at the National Academy Press Web site at www.nap.edu / (NRC, 1999). While this report was not a specific review of NMFS science and management efforts, it sought and made recommendations on how the ecosystem approach should be used and is thus useful in guiding NMFS research programs.

- *Improving the Collection, Management, and Use of Marine Fisheries Data* (2000)
  Published in 2000, this NRC commissioned report assesses methods for improving data for stock assessments and fisheries management. The summer flounder fishery was used as a case study in this report because it supported a fishery that spanned state and Federal waters over a vast geographic area, both recreational and commercial fishermen targeted the species, and there was an abundance of data available for assessments. The report analyzed summer flounder stock assessments and implicit and explicit modeling assumptions that affected modeling outcomes. The study also examined data collection and use and made 40 recommendations to Federal and state fishery agencies, Congress, regional FMCs, interstate commissions, and commercial and recreational fishermen with the objective of improving fisheries data and management. This report can be read on-line or purchased from the National Academy Press at www.nap.edu / (NRC, 2000).

- *Marine Protected Areas: Tools for Sustaining Ocean Ecosystems* (2001)
  Published in 2001, this NOAA-commissioned report evaluates marine protected areas (MPAs) as a tool to supplement conventional fishery management. The report recommended networks of MPAs, some for fishery management, embedded within broadly zoned management areas in the coastal ocean. Additionally, the study indicated that the basic knowledge gained through monitoring and evaluation of MPAs on the structure, function, and variability in marine

ecosystems would enhance the design of reserves and allow more accurate evaluations of their ecological and socio-economic consequences. Reserves would also allow more accurate estimation of parameters such as natural mortality rates—an essential variable in stock assessment models. This report can be read on-line or purchased at the National Academy Press Web site at www.nap.edu / (NRC, 2001). While this report was not a specific review of NMFS science and management efforts, it sought and made recommendations on how MPAs should be used and is thus useful in guiding NMFS research programs.

Legislative Background

The United States Congress reauthorized the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended by the Sustainable Fisheries Act (SFA), on October 11, 1996. Section 404 (Fisheries Research) of the MSFCMA requires the Secretary of Commerce to develop and publish in the Federal Register a strategic plan for fisheries research for the five (5) years immediately following such publication. The Act stipulates that the plan:

- Identify and describe a comprehensive program with a limited number of priority objectives for research in each of the research areas specified below.

- Indicate goals and timetables for the program.

- Provide a role for commercial fishers in such research, including involvement in field testing.

- Provide for collection and dissemination, in a timely manner, of complete and accurate information concerning fishing activities, catch, effort, stock assessments, and other research conducted under this section.

- Be developed in cooperation with the fishery management councils and affected states, and provide for coordination with the councils, affected states, and other research entities.

The MSFCMA requires the comprehensive program to contain the following research areas:

- Research to support fishery conservation and management, including but not limited to:

  - biological research concerning the abundance, trends, and life history of fish stocks,
  - the interdependence of fisheries or stocks of fish,
  - the identification of essential fish habitat,
  - the impact of pollution on fish populations,
  - the impact of wetland and estuarine degradation, and
  - other factors affecting the abundance and availability of fish.

- Conservation engineering research, including:

  - the study of fish behavior,
  - the development and testing of new gear technology and fishing techniques to minimize bycatch and any adverse effects on essential fish habitat, and
  - the promotion of efficient harvest of target species.

- Research on the fisheries, including:

  - the social, cultural, and economic relationships among fishing vessel owners, crew, U.S. fish processors, associated shoreside labor, seafood markets, and fishing communities.

- Information management research, including:

  - the development of a fishery information base and an information management system under Section 401 that will permit the full use of information in the support of effective fishery conservation and management.

Performance Measures

The NOAA Strategic Plan (NOAA, 2003) contains a series of performance measures for each goal. As of the preparation of this Plan, NMFS is developing supporting measures for inclusion in the NFSP (NMFS, 2003b) to contribute towards those at the NOAA level. The NOAA measures that impact the NSPFR are:

GOAL 1: PROTECT, RESTORE, AND MANAGE THE USE OF COASTAL AND OCEAN RESOURCES

Objective A. Protect and Restore Ocean, Coastal, and Great Lakes Resources

Strategy: Monitor & Observe

- Increased area covered and number of ecological conditions monitored by state-of-the art observation systems and platforms that provide necessary information for NOAA's stewardship responsibilities

Strategy: Understand & Describe

- Increased ocean, coastal, and Great Lakes areas explored, mapped, characterized, and inventoried

- Increased number of impacted human communities where sufficient data exist to analyze and understand the economic and social benefits, costs, and impacts of management decisions

- Increased number of techniques and tools that can be used to restore and protect ocean, coastal, and Great Lakes resources

- Increased number of marine resources potentially available for commercial use (e.g., pharmaceuticals, aquaculture species for human uses)

Strategy: Assess & Predict

- Increased number and accuracy of models to understand and predict the interactions of species and their environment

Objective B: Recover Protected Species

Strategy: Understand & Describe

- Increased number and adequacy of techniques and tools that can be used to restore and conserve protected species

Objective C: Rebuild and Maintain Sustainable Fisheries

Strategy: Monitor & Observe

- Increased number of fish species with adequate information to assess their condition

Strategy: Understand & Describe

- Increased number of fish species where the biological and ecological factors related to population abundance are adequately understood for management purposes

- Increased number or adequacy of techniques (including stock enhancement) and tools that can be used to restore and conserve fish species

Strategy: Assess & Predict

- Increased number of fish species with adequate population assessments, including adequate estimates of fishing or other sources

- Increased number of species whose essential fish habitat is adequately mapped and understood

- Increased use of physical-biological models for forecasting stock abundance

GOAL 2. UNDERSTAND CLIMATE VARIABILITY AND CHANGE

Strategy: Assess & Predict

- Increased number of new indicators of climate impacts on marine ecosystems

CROSS CUTTING PRIORITIES

Sound, State-of-the-Art Research

- Increased use of models and assessments among scientists, economists, social scientists, operations, and ecosystem managers

Homeland Security

- Increased number of ships with vessel monitoring systems